

WHAT IS CLAIMED IS:

- 1               1. A method for long term preservation of nucleic acid contained within  
2               eukaryotic cells the method comprising:
  - 3               i. lyophilizing an aqueous solution of intact eukaryotic cells where said  
4               solution is isotonic to the cells and is nuclease free; and,
  - 5               ii. maintaining the lyophilized cells under sealed conditions sufficient to avoid  
6               contact with atmospheric humidity.
- 1               2. A method of claim 1 wherein the aqueous solution has been treated with  
2               diethyl pyrocarbonate.
- 1               3. A method of claim 1 wherein the aqueous solution comprises sodium  
2               chloride at a concentration of between 0.8 and 1.0% by weight to volume.
- 1               4. A method of claim 1 wherein the eukaryotic cells are mammalian.
- 1               5. A method of claim 4 wherein the cells are human.
- 1               6. A method of claim 1 wherein the aqueous solution comprises a standard  
2               phosphate buffered saline solution.
- 1               7. A method of claim 1 wherein the pH of the solution is between 6.8 and  
2               8.2.
- 1               8. A method of claim 1 wherein the cells are lymphocytes.
- 1               9. A method of claim 1 wherein the cells are cultured prior to lyophilization.
- 1               10. A method of claim 1 wherein the cells are infected with an RNA virus.
- 1               11. A method for isolating intact nucleic acid from lyophilized cells  
2               comprising:

- 1                   i. lyophilizing an aqueous solution of living eukaryotic cells where said
- 2                   solution is isotonic to the cells and is nuclease free;
- 3                   ii. maintaining the lyophilized cells under sealed conditions for at least 30
- 4                   days;
- 5                   iii. unsealing the cells;
- 6                   iv. denaturing the cellular proteins to create a mixture of intact nucleic acid
- 7                   and denatured cellular proteins; and,
- 8                   v. isolating intact nucleic acid from the mixture of denatured cellular proteins
- 9                   and nucleic acid with the proviso that the cells are not revived.

1                   12. A method of claim 11 wherein the isolated nucleic acid is ribonucleic  
2                   acid.

1                   13. A method of claim 11 wherein the cells are lymphocytes.

1                   14. A collection of standardized, sealed vials containing lyophilized  
2                   eukaryotic cells for use as controls in diagnostic assays wherein the cells after 4 weeks at -  
3                   20°C have more than 50% of their 18S rRNA intact as measured by gel electrophoresis.

1                   15. A sealed vial of claim 14 wherein the cells are infected with an RNA  
2                   virus.

1                   16. A sealed vial of claim 14 wherein the cells are lymphocytes.

1                   17. A sealed vial of claim 14 wherein the vial contains an inhibitor of RNase  
2                   in an amount effective to reduce degradation of RNA.

1                   18. A nucleic acid hybridization assay kit comprising lyophilized eukaryotic  
2                   cells.

1                   19. A kit of claim 18 wherein the cells are human.

1                   20. A kit of claim 18 wherein the kit further comprises cell free nucleic acid  
2                   selected to hybridize to a known target nucleic acid.

1                   21. A kit of claim 18 wherein the kit further comprises at least one  
2                   amplification primer pair.

1                   22. A kit of claim 18 wherein the kit further comprises a labelled nucleic  
2                   acid.

1                   23. A kit of claim 18 wherein the nucleic acid hybridization assay is an  
2                   amplification based assay.

1                   24. A kit of claim 23 wherein the amplification based assay is a ligase chain  
2                   reaction based assay or a polymerase chain reaction based assay.

1                   25. A kit of claim 18 wherein the nucleic acid hybridization assay uses RNA  
2                   extracted from the lyophilized cells.

1                   26. A kit of claim 25 wherein the kit further comprises reverse transcriptase.

1                   27. A kit of claim 25 wherein the RNA is transcribed into complementary  
2                   DNA during the assay.

1                   28. A kit of claim 18 wherein the kit further comprises a vial containing the  
2                   cells wherein the vial is sealed to prevent atmospheric humidity from contacting the cells.

1                   29. A kit of claim 18 wherein the cells are infected with an RNA virus.

1                   30. A kit of claim 18 wherein the cells are lymphocytes.